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October 24, 2008

VIA ECFS

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Developing a Unified Intercarrier Compensation Regime, CC Docket No. 01-92

EX PARTE – REDACTED FOR PUBLIC INSPECTION

Dear Ms. Dortch:

NuVox, by its undersigned counsel, submits this letter in response to the AT&T letter filed October 13, 2008 in the above-captioned proceeding.[1] In that letter, AT&T calculates the costs associated with switching voice services utilizing a softswitch and concludes that such costs range from a low of $0.00010 per minute of use to a high of $0.00024 per minute of use.[2] However, AT&T's cost analysis contains numerous methodological, mathematical and sourcing errors resulting in a cost range that substantially underestimates the actual forward looking costs of transporting and terminating telecommunications traffic using a softswitch.

The attached Declaration of August H. Ankum, Ph.D., Keith Coker and James D. Webber identifies errors in AT&T's analysis and provides a corrected calculation identifying per minute softswitch termination costs ranging from $0.00758 to $0.01330, far exceeding AT&T's estimates, as well as the current $0.0007 termination rate set by the Commission for ISP-bound traffic. As Messrs. Ankum, Coker and Webber explain in the Declaration, these corrected cost estimates are more reasonably aligned with realities faced by carriers, like NuVox, that actually deploy softswitches in their networks today.

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1 Letter from Henry Hultquist, Vice President-Federal Regulatory, AT&T Services, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, CC Docket no. 01-92 (filed Sept. 13, 2008) ("AT&T Letter").

2 AT&T Letter at 4.

Messrs. Ankum, Coker and Webber explain the basis for their corrected calculations and identify and analyze the errors in AT&T's analysis in the attached Declaration. These errors include mistakes in the calculation of per line costs of softswitches, underestimates of the traffic sensitive portion of softswitches, and underestimates of the annual charge factor used to convert investment amounts into monthly per line revenue requirements. In addition, AT&T's analysis erroneously omits costs associated with necessary ancillary softswitch components, shared and common costs and traffic sensitive costs of transport.

Further, and of particular importance, Messrs. Ankum, Coker and Webber address AT&T's unreasonable assumption that softswitches can be used to terminate all relevant traffic. This assumption simply does not correspond to the reality of the marketplace and is not consistent with the "forward looking, least cost network design" requirements of either a TSLRIC or TELRIC analysis. Indeed, it is ironic that AT&T is basing its cost estimates on a "hypothetical" network configuration of 100% softswitches while it and other large ILECs have consistently highlighted the impropriety of using a "hypothetical" network cost standard.

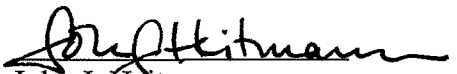
In response to the ambiguous, if not haphazard, costing approach utilized by AT&T, Messrs. Ankum, Coker and Webber also explain why TELRIC is the appropriate methodology for costing and pricing call termination costs and note that any cost methodology that fails to capture total service demand, as TSLRIC and TELRIC do, would be at odds with the plain language of Section 252(d)(2)(A)(ii): it would simply fail to capture all of the "additional costs" and capture only *some* of the "additional costs."

Messrs. Ankum, Coker and Webber also explain that use of a marginal cost construct would not be appropriate. Marginal cost calculates the additional cost associated with *one and only one* additional unit of output. Clearly, this cost construct is inconsistent – as a matter of economics – with the plain language of Section 252(d)(2)(A)(ii), which speaks not of the additional cost of terminating a single call but of the "additional costs of terminating such calls," *i.e.*, the *costs* of terminating the *total volume* of calls.

Finally, it is important to differentiate the per minute transport and termination costs calculated in this Declaration from the costs presented in NuVox's *Ex Parte* Letter of October 2, 2008. The attached Declaration *corrects* AT&T's analysis of the costs of a softswitch. However, it in no way represents the full "additional costs" incurred by carriers in transporting and terminating calls. For example, neither AT&T's analysis nor NuVox's corrected analysis includes costs for signaling, transport and aggregation facilities in collocation spaces (the importance of these components is discussed in the attached Declaration). For these and other reasons, neither AT&T's costs nor NuVox's corrected costs presented in the current Declaration should serve as a basis for setting intercarrier compensation rates. By contrast, the NuVox *Ex Parte* Letter of October 2, 2008, presents the results of a cost study QSI conducted for NuVox that reflects *all* the "additional costs" of *all* components involved in the transport and termination of calls.

Kindly direct any questions regarding this letter to the undersigned at (202) 342-8544.

Respectfully submitted,



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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of		
Developing a Unified Intercarrier Compensation Regime	)	CC Docket No. 01-92

DECLARATION OF
AUGUST H. ANKUM, PH.D., KEITH COKER AND JAMES D. WEBBER

October 24, 2008

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DECLARATION OF AUGUST H. ANKUM, PH.D., KEITH COKER AND JAMES D. WEBBER

We, August Ankum, Ph.D., Keith Coker, and James D. Webber, on oath, state and depose as follows:

I. INTRODUCTION

1. My name is August H. Ankum, and my business address is 1027 Arch, Suite 304, Philadelphia, PA, 19107. I currently serve as Senior Vice President with QSI Consulting, Inc. ("QSI").

2. My name is Keith Coker, and my business address is 2 North Main Street, Greenville, South Carolina, 29601. I am the Chief Technical Officer ("CTO") for NuVox, Inc. ("NuVox").

3. My name is James D. Webber, and my business address is 4515 Barr Creek Lane, Naperville, Illinois 60564. I currently serve as Senior Vice President with QSI Consulting, Inc.

4. This Declaration was prepared on behalf of NuVox and its purpose is to respond to AT&T's Letter to Marlene H. Dortch, Secretary, Federal Communication Commission filed in these proceedings on October 13, 2008 (hereafter referred to as the "AT&T Letter" or "AT&T's Letter").[1]

5. In its Letter, AT&T estimates "the incremental cost of switching a voice minute using [a] softswitch"[2] and arrives at a range of $0.00010 per minute of

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[1] AT&T's Letter was signed by Henry Hultquist, Vice President-Federal Regulatory, AT&T Services, Inc.

[2] AT&T Letter at 2.

use on the low end and $0.00024 on the high end. This range, in AT&T's opinion, supports termination rates "comfortably below the Commission [*sic*] current [reciprocal compensation] figure of $0.00070 per minute."[3] While AT&T admits that reciprocal compensation rates concern both transport and termination,[4] it inexplicably addresses only the termination (*i.e.,* switching) portion of reciprocal compensation rates.

6. AT&T's analysis is best summarized by the table included at page 5 of its Letter, as replicated below:

AT&T Estimates

	Low estimate	High estimate
Total investment per line	$34.00	$80.00
Percent traffic sensitive	20%	20%
Traffic-sensitive investment per line	$6.80	$16.00
Switching annual charge factor	25%	25%
Monthly TS revenue requirement per line	$0.142	$0.333
Monthly switching minutes per line	1400	1400
Switching cost per minute	$0.00010	$0.00024

7. The organization of this declaration is as follows. First, we demonstrate that there are several methodological, mathematical and sourcing errors in AT&T's analysis that cause it to substantially understate costs associated with transport and termination of telecommunications traffic. We then correct AT&T's errors and present cost estimates more reasonably aligned with realities faced by carriers that actually deploy softswitch networks today.

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[3] *Id.* at 4.

[4] *Id.* at 1.

8. Our revised estimates will show that even if we were to assume that all telecommunications networks were reliant solely upon softswitch technologies (an unreasonable assumption as we explain in the final section of this Declaration), per minute transport and termination costs range between $0.00758 and $0.01330 -- well above AT&T's estimates and the current rate of $0.0007 established by the FCC for internet service provider ("ISP")-bound traffic.

9. It is important to differentiate the per minute termination costs calculated in this Declaration from the costs presented in NuVox's *Ex Parte* Letter of October 2, 2008. The current Declaration *corrects* AT&T's analysis of the costs of a softswitch. However, it in no way represents the full "additional costs" incurred by carriers in transporting and terminating calls. For example, neither the AT&T analysis nor our corrected analysis includes costs for signaling, transport and aggregation facilities in collocation spaces (the importance of these components will be discussed presently). For these and other reasons, neither the AT&T nor our corrected costs presented in the current Declaration should serve as a basis for setting intercarrier compensation rates.

10. By contrast, the NuVox *Ex Parte* Letter of October 2, 2008, presented the results of a cost study QSI conducted for NuVox that reflects *all* the "additional costs" of *all* components involved in the transport and termination of calls.

II. AT&T'S ANALYSIS IS INVALIDATED BY ERRORS, OMISSIONS AND UNSUPPORTED ASSUMPTIONS

11. AT&T's analysis suffers from a number of inaccuracies, omissions and unsupported assumptions; these fatal flaws are discussed in detail below.

A. AT&T Errs in Its Calculation of Per Line Softswitch Investment

12. AT&T calculates a "High Estimate" for total investment per line at $80. AT&T derives this number in the following three steps:[5] (1) AT&T estimates the cost for a Class 5 circuit-switch in the 1999-2000 timeframe at $128 per line; (2) AT&T estimates the per line cost for a Class 5 switch in 2008 by assuming that switch prices fell at an annual rate of 3% and applying this assumption to the estimate of $128 (the result is $100); (3) AT&T assumes that the cost saving for softswitches over circuit switches are 20%, and applies this percent reduction to produce its final "High Estimate" for Total Investment per Line (which is $80). As we explain below, all three steps contain serious flaws.

13. AT&T claims that its calculations in Step 1 are based on the fixed and per-line switch cost adopted by the Commission in its *Tenth Report and Order*.[6] Yet the number AT&T cites as being adopted by the Commission for Class 5 host switches ($468,700) is incorrect. The correct number is $486,700 – it appears that AT&T's analysts simply transposed the second and third figures when

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[5] *Id.* at 2-3 resulting in the $80 per line estimate employed in table on p. 5 of the letter.

[6] *Id.* at 2, n.7 citing *Federal-State Joint Board on Universal Service, Forward-Looking Mechanism for High Cost Support for Non- Rural LECs,* CC Docket Nos. 96-45, 97-10, Tenth Report and Order, 14 FCC Rcd 20156 (1999) ("*Tenth Report and Order*").

inputting the values into its analysis.[7] With this correction AT&T's estimate in Step 1 should be $129 instead of $128 per line.

14. AT&T's assumption in Step 2 – that switch prices fell by 3% annually over the relevant period – is simply wrong. Switch prices in 2008 are essentially at the same level as they were in the 1999-2000 timeframe. Specifically, according to the most recent AUS Telephone Plant Index ("TPI"),[8] the price index for Digital Electronic Switching is currently 24,[9] and ranged between 22 and 25 in 1999-2000.[10] In other words, the *cumulative* 8-year decrease in switch prices, as reported by AUS, is no more than 4% in total,[11] which is radically different from AT&T's *assumption* of a 3% *annual* decrease for each year over that period (which translates to a cumulative reduction equal to 22%).[12] With this correction, the resulting per line cost for a Class 5 switch in 2008 is $124[13] (replacing AT&T's erroneous estimate of $100).

15. AT&T's numerical assumption in Step 3 (20% cost savings for softswitches over circuit switches) is based on manufacturers' advertising claims. Clearly, these claims – claims that are carefully formulated as "can save" and "up to" –

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7 *Tenth Report and Order* ¶ 296 ("We adopt the fixed cost (in 1999 dollars) of a remote switch as $161,800 and the fixed cost (in 1999 dollars) of both host and stand-alone switches as $486,700. We adopt the additional cost per line (in 1999 dollars) for remote, host, and stand-alone switches as $87.").

8 *AUS Telephone Plant Index*, Bulletin No. 38 (Cost Trend Tables from 1946 to July 1, 2008). This is a semi-annual index, with data points reported for January and July of each year and expressed in 1973 dollars.

9 *Id.* (July 2008 data).

10 *Id.* (the value of 22 corresponds to the price index for January 2001).

11 Measured from the high value of 25 observed in 1999-2000 to the current value of 24.

12 Calculated as (1 - $100/$128), or, equivalently $(1 - 0.03)^8 - 1$.

13 Calculated as $129 *24/25.

cannot be considered objective, and, in fact, they contradict NuVox's actual experience. Indeed, not only are the initial investment savings experienced by NuVox smaller than the manufacturers' claims, but the ongoing operations are more expensive for a softswitch compared to a circuit switch. Further, as discussed below, AT&T's cost saving assumption does not account for the fact that the softswitch alone is but one piece of the packet-enabled platform that supports voice-switching in a modern network. Additional ancillary equipment must be included before a softswitch can operate effectively as a voice switch. Nevertheless, even if we use AT&T's 20% cost-savings assumption derived from these claims, the "High Estimate" for Total Investment per Line resulting from corrections in Steps 1 and 2 is $99,[14] instead of AT&T's $80.

16. AT&T Letter derives its "Low Estimate" for Total Investment per Line ($34)[15] using softswitch sales and port volumes reported by Dittberner Associates. As is evident from examination of the source data,[16] the reported sales and port volumes are world-wide figures, and as such, are very poor estimates for the softswitch cost incurred by US carriers. Further, AT&T recognizes that "Dittberner figures may exclude some of the softswitch installation services necessary to engineer fully these switching systems."[17] Indeed, AT&T's "Low Estimate" conflicts substantially with actual NuVox

[14] Calculated as $124 * 80%.

[15] The derivation is done on at 3 of AT&T Letter.

[16] AT&T's Letter provides the hyperlink to the source in its footnote 13, which is http://www.dittberner.com/news/press_release.php?id=79.

[17] AT&T's Letter at 3.

data in two important ways: (1) AT&T has included only the cost of the soft-switch/router itself and has excluded necessary call control and other periphery equipment that must be included to accommodate voice traffic; (2) even without the additional equipment, the price paid by NuVox solely for the soft-switch itself on a per-port basis substantially exceeds AT&T's "Low Estimate." Specifically, NuVox's experience is that softswitch purchases – although not priced on a per line basis – exceed **[BEGIN HIGHLY CONFIDENTIAL END HIGHLY CONFIDENTIAL]** per DS0 equivalent without including ancillary equipment necessary to either originate or terminate traffic from other carriers as is required under section 251(b)(5). It is primarily for this reason (*i.e.*, the gross disparity between AT&T's poorly structured estimate and conflicting, real-world data) that we believe AT&T's "Low Estimate" must be removed from consideration in its entirety as a reasonable proxy for terminating costs.

B. AT&T's Per-Line Investment Calculations Omit Necessary Ancillary Softswitch Components

17. In addition to the above errors, AT&T errs by excluding numerous necessary network components related to softswitches without which the softswitches would be completely incapable of either originating or terminating calls from another carrier for any purpose, let alone terminating traffic pursuant to 251(b)(5). As discussed below, the costs of these components are traffic sensitive, in that they stand in direct relationship to traffic and, therefore, should be included in the cost of terminating traffic.

18. Specifically, AT&T's analysis ignores such necessary components as multiplexers, routers, application servers, policy servers, signaling gateways and session border controllers. Without each of these components, softswitches can neither originate nor terminate calls to an outside network.

19. The functionality of the components omitted by AT&T can be summarized as described below.[18]

Multiplexers, as utilized in the NuVox network (as well as most other CLECs' networks), provide for connectivity, circuit management and aggregation as circuits appear from collocation sites and are connected to aggregated central office facilities. The costs related to multiplexers generally vary with circuit counts and traffic volume in a packetized network.[19]

Routers transport voice traffic throughout the NuVox network, ultimately aggregating and delivering traffic to the softswitches that interact with the public switched telephone network ("PSTN"). NuVox deploys at least four levels of routers within its network[20] and it has been NuVox's experience that capital expenditures for routers are traffic-sensitive. Specifically, Internet Protocol ("IP") voice traffic, by its very nature, generates large volumes of packets as calls are held in service. The voice traffic pushes routers toward their Packets Per Second ("PPS") limitations, which forces NuVox to implement upgrades to router processors and/or line cards to accommodate traffic or to add additional routers all together. We include certain NuVox-specific router-related costs in our updated analysis below.

Servers provide sources of information used to determine line level capabilities and other necessary information required to originate and terminate voice calls. For example, application servers are essential to the call setup and tear down portions of communication sessions. The Central Processing Units ("CPUs") in application servers, for example, are sized based upon message volume. Moreover, application server costs generally vary proportionately to the number of busy hour calls they support. NuVox's

[18] Network probes – required to maintain voice quality in a packetized network – are discussed elsewhere in paragraph 23 of this Declaration and, therefore, are not listed here.

[19] These additional costs, although reasonably included in the cost of transport and termination of telecommunications, have not been added into our analysis.

[20] Most CLEC configurations employ multiple routers in a hierarchal fashion. NuVox, for example, generally utilizes four separate routers as depicted in Attachment No. 1 to this affidavit. The CA Router, LA Router, GSR Router and ONS Router are all utilized in NuVox's typical deployment.

experience demonstrates that server costs are sensitive to traffic volume and we include NuVox-specific cost information related to server costs in the revised analysis below.[21]

Session Border Controllers ("SBCs") serve as firewalls for packetized traffic between NuVox's network and other companies' networks, ensuring the security of communications and the network. SBCs are involved in every call and it has been NuVox's experience that these pieces of equipment are session limited. The need for Session Border Controllers increases directly with the number of SIP sessions and, as such, their costs are traffic-sensitive. We include NuVox-specific SBC costs in the analysis below.

Signaling Gateways generally support simultaneous connections, providing intelligence to the packet environment similar to that provided in the circuit switched environment by SS7 equipment. They also provide critical connectivity to the outside SS7 world, without which calls could not originate or terminate. We include NuVox-specific costs in the analysis below.

20. Each of these components is depicted in Attachment No. 2 to this affidavit. Given that the costs of each of these components are traffic sensitive and critical to the operation of a softswitched voice network, our analysis includes costs as described above.

C. AT&T Underestimates the Traffic Sensitive Portion of a Softswitch

21. The AT&T Letter assumes that 20% of switching cost is traffic sensitive. In support of this assumption, AT&T references an affidavit by Dr. Currie filed on behalf of AT&T in Michigan.[22] AT&T's 20% assumption, however, is

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[21] Note that we have excluded any "feature" costs such as those related to call forwarding, call waiting, etc. Also note that any "per line" or "per subscriber" license costs are not included in this analysis. Our intent is to capture non-customer-specific, usage sensitive costs only.

[22] AT&T Letter at 3-4 and n.16. Footnote 16 references Dr. Currie affidavit in Michigan Public Service Commission ("PSC") Case U-14781 (the case that addressed TELRIC cost of Michigan Exchange Carrier Association ("MECA") ¶¶ 56-57 and provides the following hyperlink: http://efile.mpsc.cis.state.mi.us/efile/docs/14781/0190.pdf. This link contains December 3, 2007 Affidavit of Dr. Kent A. Currie in Support of AT&T Michigan's Objections to the October 19, 2007 MECA Compliance Filing ("Currie Affidavit"). In his affidavit, Dr. Currie critiques and proposes modifications to the compliance studies of the MECA members – studies that were based on a softswitch architecture.

incorrect for a number of reasons. First, an examination of the referenced Michigan affidavit shows that Dr. Currie's estimate for the traffic-sensitive portion of switching cost is actually *50%*, rather than 20%, as erroneously claimed in the AT&T Letter.[23]

22. The 20% number (cited in the AT&T Letter[24]) is a *portion of line-related investment in total switching investment* (alone with usage and non-line-related (fixed) investment). The observation that 20% of switching investment is line-related was Dr. Currie's intermediary comment and did not capture his final recommendation about the percent of traffic-sensitive switching cost – his final recommendation was 50%. Specifically, after analyzing traffic sensitive switch costs, Dr. Currie concludes:

> Accordingly, the adjustments which I made to the MECA cost studies and which are reflected in the compliant rates shown in Confidential Schedule 2 treat 50% of local switching costs as non-traffic sensitive and *50% as traffic sensitive*. The non-traffic sensitive costs are included with switch port costs, and the traffic sensitive costs are included with local switching costs.[25]

23. Further, is it worth noting that in state cases where AT&T's own local switching costs were at issue (as opposed to the above discussed Michigan PSC Case U-14781 that addressed costs of other incumbent carriers), AT&T advocated an even *higher* percent of traffic-sensitive switch cost. For

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[23] Specifically, see Dr. Currie's conclusion in ¶ 59 of the Currie Affidavit. Similarly, Michigan PSC Staff summarized Dr. Currie's analysis as follows: "AT&T proposes, based on the analysis of Dr. Currie, that the Commission should "treat at least 50% of the local switching costs as non-traffic sensitive."" Michigan PSC Case U-14781, Staff's Response to the Objections Filed to the Compliance Filings of the 12 Individual MECA Companies at 19-20 (Jan. 2, 2008).

[24] AT&T Letter at 3.

[25] Currie Affidavit ¶ 59.

example, in the Michigan SBC UNE case (Michigan PSC Case U-13531),[26] Dr. Currie noted that a number of state commissions adopted a traffic-sensitive percent in the vicinity of 70%, and that this number was deemed reasonable by the FCC in its September 18, 2002 BellSouth interLATA services order.[27] In the same UNE case, Dr. Currie also defended his opinion that a large portion of switch cost is traffic sensitive by invoking the cost-causality standard: "End-users with different levels of switch usage cause differences in switch costs. Usage rates are necessary to reflect cost causation and to avoid cross subsidies."[28] He further explained that "[i]n spite of the fixed "per line" pricing from the switch vendors to SBC Michigan, long-run switch costs still depend on usage"[29] and "[i]f customer usage increases to the point that more customers vie for talk paths than there are paths available, blocking occurs, and equipment capacity is added to serve the additional demand. This is the precise definition of usage-sensitive equipment."[30]

24. AT&T's assumption that only 20% of switch cost is traffic sensitive also conflicts with the realities of how softswitches are deployed by smaller carriers, such as CLECs. For example, in reviewing NuVox's soft-switch

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[26] Note that while local switching cost may be addressed in the context of reciprocal compensation or UNE rates, they are often based on the same cost models and underlying principles, as it happened in Michigan PSC Case U-13531.

[27] Michigan Case U-13531, *In the matter, on the Commission's own motion, to review the costs of telecommunications services provided by SBC Michigan,* Rebuttal Testimony of Dr. Kent A. Currie at 41 (Mar. 22, 2004) ("Currie Testimony") available at http://efile.mpsc.cis.state.mi.us/efile/docs/13531/0381.pdf). Note that the specific assumption about the percent of traffic-sensitive cost utilized in AT&T (SBC) cost studies in this case is confidential.

[28] *Id.* at 4.

[29] *Id.*

[30] *Id.* at 41.

network, we have determined that there is little if any non-traffic sensitive "line-side" investment on the soft-switch platform. That is, there are no end-user dedicated facilities (such as analog line-cards) that are typically designated as the non-traffic sensitive portion of switching costs.[31] Instead, the softswitch is comprised of finite capacity, all of which is dedicated to the task of switching voice traffic as that traffic is presented to the switch from any number of products and/or applications.

25. The usage-sensitive nature of periphery equipment needed to support the softswitch is even more profound. For example, much of the software and even portions of the hardware necessary for voice quality assurance on an IP-enabled network (*e.g.*, various probes and the session border controllers themselves) are licensed based upon usage characteristics including concurrent call paths, or sessions. Further, much of the intellectual property

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[31] In ¶1057 of its *Local Competition Order (In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers,* CC Docket Nos. 96-98 and 95-185. First Report and Order (rel. Aug. 8, 1996) (*"Local Competition Order"*)), the FCC found that line ports, which are dedicated to end users, are non-traffic sensitive costs and should not be included in the "additional" cost of termination. The FCC also found that only "usage sensitive" costs should be included:

> We find that, once a call has been delivered to the incumbent LEC end office serving the called party, the "additional cost" to the LEC of terminating a call that originates on a competing carrier's network primarily consists of the traffic-sensitive component of local switching. The network elements involved with the termination of traffic include the end-office switch and local loop. The costs of local loops and *line ports* associated with local switches do not vary in proportion to the number of calls terminated over these facilities. We conclude that such non-traffic sensitive costs should not be considered "additional costs" when a LEC terminates a call that originated on the network of a competing carrier. For the purposes of setting rates under section 252(d)(2), only that portion of the forward-looking, economic cost of end-office switching that is recovered on a *usage-sensitive* basis constitutes an "additional cost" to be recovered through termination charges.

(Emphasis added; footnote omitted).

costs inherent in an IP-enabled network are governed by usage-driven statistics.

26. In fact, because softswitches are deployed (at least within the NuVox network) to "switch" packets of information from inbound trunks to outbound trunks (*i.e.*, no portion of the softswitch is dedicated to one particular end user or customer) the entire softswitch is properly treated as a shared facility. Further, because the softswitch is sized based solely upon the volume of traffic it can accommodate, from a costing perspective, the softswitch should be treated the same way as tandem switch has been treated in the circuit switched environment – *i.e.*, as 100% usage sensitive investment, shared amongst all minutes of use it accommodates. However, we understand that opinions may differ in regard to this question. Therefore, in our re-statement of AT&T's analysis we employ a conservative assumption that 80% of switching cost is traffic sensitive to generate the "Low Estimate" of our revised per minute transport and termination cost. For our "High Estimate" we assume that 100% of switching costs are traffic-sensitive.

D. AT&T Underestimates the Annual Charge Factor

27. One of the final steps in the AT&T analysis is the conversion of investment into "monthly traffic sensitive revenue requirements per line." To accomplish this task, AT&T applies an Annual Charge Factor of 25% to the per line investment.[32] AT&T claims that this value is conservative because the FCC

[32] AT&T Letter at 4.

input for "capital recovery and maintenance" adopted in the *Tenth Report and Order* was even lower at 19.1%.[33] AT&T's justification for its 25% assumption is conceptually flawed[34] because "capital recovery and maintenance" are only two of the many groups of costs that need to be recovered through cost factors. Omitted from AT&T's analysis are shared and common cost (discussed further below), as well as such important direct[35] switch-specific costs as land, buildings and power associated with the switch.[36]

28. Land, building and power costs associated with the switch typically constitute an approximate 10 percentage point addition to the maintenance and capital recovery factors taken alone. As such, adding those costs to the 25% capital recovery estimate of AT&T results in a corrected Annual Charge Factor in the vicinity of 35%. This number is far more consistent with annual charge

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[33] *Id.* at 4, n.24.

[34] AT&T's Letter also fails to consider the differences between TDM and softswitches. For example, Embarq suggested before the Texas PUC that "Asset lives [for IP switches] will be different and likely shorter than with TDM." (Embarq's presentation to the Cost Modeling Workgroup *Local Exchange Carrier IP Switching and Transport Network Design,* at 7, Texas PUC Project No. 34293 ("Project for Staff Study of Cost Models in Connection with Substantive Rule §26.403 Texas High Cost Universal Service Plan (THCUSP)") (July 25, 2007) ("Embarq's Presentation"). Shorter asset lives for softswitches compared to circuit switches suggest that softswitches would have higher Annual Charge Factors (other things being equal).

[35] We call them "direct" to distinguish from the shared and common cost, which are also omitted by AT&T, as discussed below.

[36] As explained in the *Tenth Report and Order* at ¶ 417, land and building investment associated with the switch are explicit investment categories (separate from switch investment) within the switching module of the FCC Synthesis Model. Note that in other cost models, such as the AT&T (SBC) cost models, land and building costs associated with switching are recovered through cost factors (rather than through direct modeling of investment).

factors AT&T has advocated in the past when its own switch-based rates are being evaluated.[37]

E. AT&T Fails to Include Shared and Common Costs

29. AT&T's per-minute of use cost calculation fails to account for shared and common costs. Shared and common costs, however, are standard cost components under forward-looking cost methodologies and certainly under the FCC's Total Element Long Run Incremental Cost ("TELRIC") methodology.[38]

30. As the FCC found in ¶1058 of its *Local Competition Order*:

> A rate equal to incremental costs may not compensate carriers fully for transporting and terminating traffic when common costs are present. We therefore reject the argument by some commenters that "additional costs" may *not* include a reasonable allocation of forward-looking common costs. [...] To ensure that rates for reciprocal compensation make possible efficient competitive entry, we conclude that termination rates *should include an allocation of forward-looking common costs.*[39]

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[37] This number is based on our experience with recent AT&T UNE cost cases and is in line with AT&T proposals in these cases. While AT&T cost studies are generally confidential, AT&T (Ameritech) 1997 cost studies from Ohio UNE case 96-922-TP-UNC were recently released from confidential status by the Ohio Commission. (See http://dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=96-922-TP-UNC&x=6&y=11). These cost studies contain much higher ACFs for digital switching. Specifically, Annual Charge Factors in the March 18, 1997 filing ranged from 37% to 41% depending on the type of the switch. Another factor that makes our assumption for the Annual Charge Factor conservative is the fact that power expenses have increased significantly compared to their historical levels. For example, prices for energy goods more than doubled compared to the year 2000. Specifically, based on the most recent (2Q 2008) Gross Domestic Product Price Index for "gasoline, fuel oil, and other energy goods," energy prices constitute 231.5% of the level observed in 2000 (see Bureau of Economic Analysis, *National Income and Product Accounts* Table 1.5.4 "Price Indexes for Gross Domestic Product, Expanded Detail", available at http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=34&Freq=Qtr&FirstYear=2006&LastYear=2008).

[38] *Local Competition Order* ¶ 629;47 CFR §§ 51.505 and 51.705.

[39] *Id.* ¶ 1058 (emphasis added).

31. Shared and common cost markups often capture such cost categories as corporate operations expenses, customer service expenses, plant non-specific expenses and general support cost.[40] Likewise, shared and common costs are typically expressed as a markup on direct cost. While the shared and common markup percentages *approved* in RBOC UNE cases may approach 30%,[41] RBOCs' *proposed* shared and common mark ups are even higher.[42] Further, because of scale economies, it is reasonable to expect that RBOCs would have lower shared and common overhead than smaller companies (CLECs and small ILECs).[43] In other words, a shared and common mark up of 25% (the value used in our restatement of AT&T's analysis below to generate the "High Estimate" of transport and termination per minute cost) is a highly conservative value. Nevertheless, in order to demonstrate that, even without this correction, our re-stated cost estimates are significantly higher than

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[40] See *Tenth Report and Order* ¶ 19 ("There are also a number of expenses and general support facilities (GSF) costs associated with the design of a forward-looking wireline telephone network. GSF costs include the investment related to vehicles, land, buildings, and general purpose computers. Expenses include: plant-specific expenses, such as maintenance of facilities and equipment expenses; plant non-specific expenses, such as engineering, network operations, and power expenses; customer services expenses, such as marketing, billing, and directory listing expenses; and corporate operations expenses, such as administration, human resources, legal, and accounting expenses." (footnotes omitted)).

[41] For example, in the most recent SBC Ohio UNE case the Ohio Commission ordered a 27.72% shared and common factor. *See* Case No. 02-1280-TP-UNC ,*In the Matter of the Review of SBC Ohio's TELRIC Costs of Unbundled Network Element,* Order at 103 (Nov.2, 2004).

[42] While RBOCs' proposed shared and common mark ups are typically confidential, Qwest's recent public filing in the Colorado Public Utilities Commission UNE case proposes common and shared markup of 39.6% for most elements, and as high as 76.8% for some elements. *See* Public Utilities Commission of Colorado, Docket No. 07A-211T, *In the Matter of Qwest Corporation's Application, Pursuant to Decision Nos. C06-1280 and C07-423, Requesting that the Commission Consider Testimony and Evidence to Set Costing and Pricing of Certain Network Elements Qwest is Required to Provide Pursuant to 47 U.S.C. §§ 251(8) and (C),* July 2, 2008 Qwest Filing available at http://www.dora.state.co.us/puc/DocketsDecisions/DocketFilings/07A-211T_Qwest07-02-08Testimony.zip.

[43] This is true because CLECs will have a relatively lower level of output and direct cost over which to spread their shared and common costs.

AT&T's estimates, we assumed 0% shared and common mark up in our calculation of the "Low Estimate."[44]

F. AT&T Fails to Account for Traffic Sensitive Costs of Transport and Aggregation

32. AT&T's analysis accounts only for a carrier's traffic sensitive costs of local softswitch-based switching; however, it fails to account for the traffic sensitive costs associated with transport. Sec 251(b)(5) of the Telecommunications Act of 1996 states:

> **SEC. 251. [47 U.S.C. 251] INTERCONNECTION.**
> (5) RECIPROCAL COMPENSATION.--The duty to establish reciprocal compensation arrangements for the *transport* and *termination* of telecommunications.

33. Further, given the FCC's prior definition of termination, it seems clear that AT&T's analysis fails even to account for all necessary termination costs on a CLEC network. For example, in its *Local Competition Order*, the FCC defined "termination" for purposes of section 251(b)(5) as follows:

> We define "termination," for purposes of section 251(b)(5), as the switching of traffic that is subject to section 251(b)(5) at the terminating carrier's end office switch **(or equivalent facility) and delivery of that traffic from that switch to the called party's premises.**[45]

Thus, the FCC explicitly found that "delivery of [...] traffic from [the] switch to the called party's premises" is part of termination. This observation is particularly relevant to CLECs because they typically deploy networks that

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[44] This assumption does not change our opinion that shared and common costs must be recoverable in any terminating charge in order for those rates to be reasonably compensatory.

[45] *Local Competition Order* ¶ 1040 ((emphasis added).

rely heavily on transport facilities between their local switching platform and collocation facilities in an ILEC central office before ultimately connecting to the customer's local loop.

34. CLEC end-office switch locations generally do not include analog-based, customer-dedicated terminations (such as Main Distribution Frames and line-side DS0 level switch ports/cards) that are traditionally found in the ILEC central offices. Indeed, even where softswitches are deployed in NuVox's network, customer dedicated, or non-traffic sensitive, connections generally take place within collocation facilities which are connected to NuVox's central offices by traffic sensitive transport facilities.[46] As such, including the costs of the traffic sensitive transport in an analysis designed to determine the cost of traffic termination is not only consistent with the FCC's rules, but absolutely critical if one intends to accurately determine the *actual* cost of traffic termination.

35. To fully appreciate the extent to which CLECs may incur traffic sensitive costs not incurred by ILECs, it is worthwhile to compare the CLEC and ILEC network architectures in more detail.

36. CLECs often enter the market with a distributed network architecture that is significantly different from that of the ILECs. Under this distributed architecture, CLECs tend to substitute longer transport routes for switching

[46] Embarq indicated before the Public Utility Commission of Texas that the costs of networks including IP switches – as compared circuit switches – would need to "reflect incremental line gateway equipment to terminate/interface analog loops to IP," as well as additional costs associated with "increased transport requirements for IP." *See Embarq's Presentation* in *Texas PUC Project No. 34293* at 13.

nodes and outside plant facilities, while at the same time providing origination/termination services throughout large geographic areas roughly comparable in size to areas served, for example, by ILEC tandem switches (which aggregate traffic from the ILEC's many end office switches).

37. The two diagrams below illustrate and compare the two different architectures. The first diagram shows that while the traditional distributed ILEC architecture uses both Class 5 (end office) [47] and Class 4 (tandem) offices[48], CLECs generally deploy switches that provide a combined Class 5 (end office) and Class 4 (tandem) functionality (rather than switches that provide those functionalities on a stand-alone basis). Nonetheless, even though CLECs may not include a stand-alone tandem switch, they are still required to invest in transport facilities that stretch from their switching platform out to collocation arrangements wherein they house equipment capable of aggregating individual customer traffic onto the larger, shared network. These transport and aggregation facilities fall under either the "transport" or the "termination" definitions of the FCC's rules and, thus, it is indisputable that they must be recovered.

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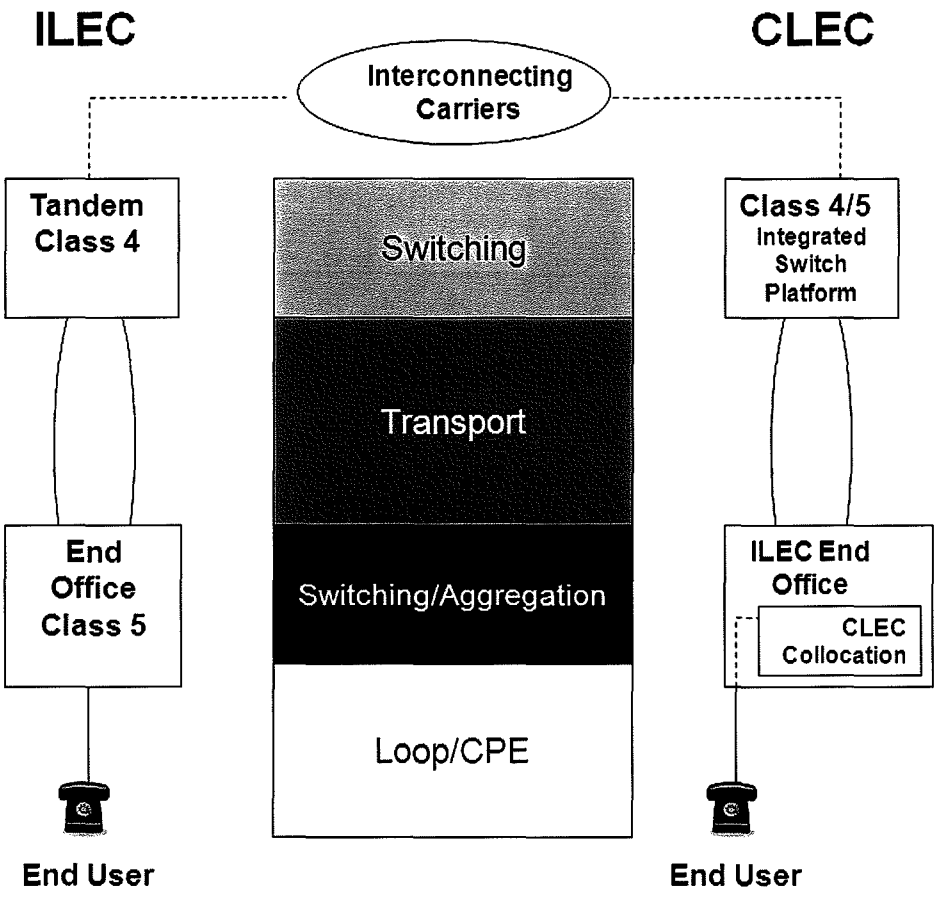
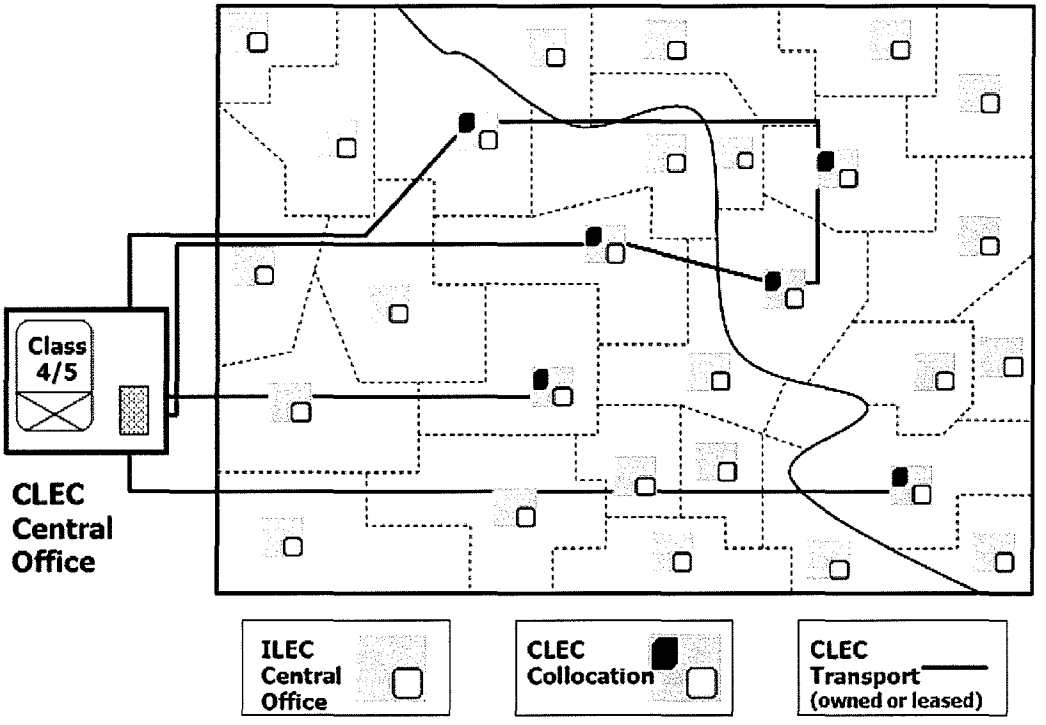
[47] Class 5 (end office) switches typically aggregate the traffic of end user customers over end user loops, which terminate at the switch. They also provide the vertical features, such as call waiting, etc.

[48] Class 4 (tandem) switches are typically used to aggregate the traffic from end office switches and provide a point in the ILEC network at which IXCs can connect for terminating and originating long distance calls.



38. The second diagram (below) represents a typical CLEC architecture that uses a single switch to serve a geographic area comparable to the serving area of an ILEC tandem (or, equivalently, a large number of ILEC central offices). Because the CLEC can expect to serve only a fraction of all the customers in a given area as compared to an ILEC who serves a substantial customer base in each area, the CLEC must extend its network across a larger geographic area in order to attract customers in numbers necessary to more fully utilize its switching resources.

Distributed CLEC Network Design



39. By extending their switching and transport networks into collocated arrangements in multiple ILEC central offices, CLECs often are able to serve a customer base that is spread out across an entire state or LATA using a single, integrated end office and tandem switching platform.

40. The cost advantages of this architecture are that it minimizes the amount of switching and central office investment required to serve a more *dispersed customer base*, both by minimizing the number of Class 5 local switches required, as well as reducing the need for a stand-alone tandem switch. However, the tradeoff is that this network architecture requires additional investments in *transport* and *collocation*.

41. Transport costs and collocation costs – which are completely ignored by AT&T – have significant traffic sensitive components. For example, larger volumes of terminating traffic to specific locations require higher capacity and more expensive transport facilities. Collocation facilities, in turn, are sized, in part, to accommodate terminating trunks and traffic. To the extent that larger volumes of terminating traffic to a specific collocation site require more or higher capacity level of trunk terminations, collocation costs increase. In other words, transport and collocation costs are, in significant part, traffic sensitive and as a result, some portion of those costs must be included in termination rates. AT&T's analysis completely ignores any type of transport costs, let alone the increased transport costs that CLECs are likely to face.

III. A "FORWARD LOOKING, LEAST COST NETWORK DESIGN" WOULD NOT CONSIST OF 100% SOFT-SWITCHES

42. As we describe above, AT&T's analysis is riddled with errors and omissions. However, its largest flaw is methodological: AT&T makes the implicit assumption that reasonable transport and termination rates can be calculated under an assumption that all traffic is accommodated by a softswitch. This assumption simply does not correspond to the reality of the marketplace and is not consistent with the "forward looking, least cost network design" requirements of either a TSLRIC or TELRIC analysis.[49]

[49] Total Service Long Run Incremental Cost ("TSLRIC"). *See* CFR §51.705, §51.711 and §51.505, as well as the discussion below addressing the appropriateness of the forward-looking cost standard to reciprocal compensation rates.

43. CLEC networks are often used as benchmarks for forward-looking technologies because they have been recently designed and deployed without the same historical issues that often face incumbent carriers with legacy technologies. However, even with this ability to choose technologies based solely upon their need to effectively and efficiently serve customers, the vast majority of CLECs, including NuVox, have constructed and continue to operate hybrid networks employing both IP-enabled and circuit-switching platforms. Further, for the foreseeable future, this same hybrid architecture is expected to prevail, in one form or another, and the majority of NuVox's, and other carriers', customers and usage will continue to be accommodated in large measure by circuit switches.

44. There are numerous reasons why a hybrid architecture remains the most efficient "forward looking" and "least cost" network design choice for most CLECs and ILECs. Indeed, even AT&T in recent proceedings has strongly opposed initiatives that would base its own costs on an assumed architecture employing solely softswitches. For example, less than one year ago in Texas Public Utilities Commission ("PUC") Docket No. 34723, wherein AT&T's costs were being evaluated in relation to the state's Universal Service Fund ("USF"), AT&T's witnesses filed testimony supporting a *forward-looking* network based on a 100% *circuit-switched* network, *i.e.*, 0% softswitches.[50]

[50] Texas PUC Docket No. 34723 *Petition for Review of Monthly Per Line Support Amounts from the Texas High Cost Universal Support Plan Pursuant to PURA § 56.031 and Subst. R. 26.403.* ("*Texas USF Docket*") Testimony of AT&T witness Steve Turner (November 16, 2007) at 13.

45. In the related Texas project,[51] while exploring whether a 100% softswitch-based network was appropriate or optimal, AT&T noted that a combination of circuit switches and softswitches would most likely be optimal:

> It is quite possible that in certain situations, the appropriate answer from a network perspective for the use of softswitching is that it is implemented *in combination with* a circuit-based switching solution. In other words, instead of requiring remote terminals everywhere, as discussed above, utilizing both types of switches *might make the most sense from a network architecture perspective.* Moreover, it is also *likely* that customer-specific requirements within a wire center may be the driver for using more than one type of switch. *The bottom line is that the use of a single type of switch – either softswitch or circuit switched – may not be the appropriate answer given the requirements for the network placed by customers.*[52]

46. Further, in that same Texas proceeding, AT&T and other ILEC cost experts also noted that softswitches may not always be the most efficient solution for the following reasons:

> A critical concept to consider from a modeling perspective with softswitching is the types of interfaces that are available on the softswitch. According to our preliminary research, softswitches do not have what are commonly referred to as analog interface cards. Analog interface cards are found in a circuit-based switch and are used to signal and provide power to POTS lines that are served exclusively over copper. According to our preliminary investigation, with a softswitch, *all lines* must be on a digital loop carrier or its equivalent to take the analog lines and place them in a format that will interface with the softswitch.[53]

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[51] Texas Project No. 34293. This project lead to the Texas USF Docket No. 34723.

[52] Texas PUC Project No. 34293, Letter by Mike Lieberman and Steve Turner on behalf of AT&T, at 2 (emphasis added) (July 10, 2007).

[53] *Id.* at 1 (emphasis added).

Embarq noted that "[t]o date, no connecting wireless or major IXC has requested an IP interconnection arrangement"[54] and that an IP switching network "[r]equires interface to the existing PSTN networks as significant volumes of traffic will continue to be TDM for many years."[55]

47. In other words, an assumption of 100% softswitches requires an equally unrealistic assumption that all lines originating at customer premises will be delivered to the softswitch in digital format – a requirement that would require enormous changes to the existing local network.

48. Next, it is also important to note that all large ILECs refuse to interconnect on an IP basis. AT&T, Qwest and Verizon have all prohibited competitive carriers from interconnecting with their networks for the passage of local or long distance traffic using Internet Protocol ("IP") based signaling. As such, AT&T's assumption that 100% of traffic termination could be accommodated by softswitch platforms falls flat when you consider that AT&T will not accept CLEC traffic (either for local or long distance purposes) using the native IP-enabled format of those same softswitches.

49. Last, it is ironic that AT&T is basing its cost estimates on a "hypothetical" network configuration of 100% softswitches while the company in the recent

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[54] *Embarq's Presentation in Texas PUC Project No. 34293* at 7. *See also Currie Affidavit* ¶ 24 ("Because the interexchange network with which a softswitch needs to interconnect is generally circuit-based rather than packet-based, the softswitch uses Time Division Multiplex ("TDM") cards for the provision of non-Internet-protocol inter-switch trunking."). While Dr. Currie makes this statement to describe MECA's cost study, he appears to agree with this statement. Further, in ¶ 53 he also notes that "AT&T Michigan has not contested in this proceeding that the investment associated with TDM cards is traffic sensitive."

[55] *Embarq's Presentation in Texas PUC Project No. 34293* at 7.

past has so vigorously resisted the "hypothetical" network standard. For example, the same Dr. Currie, on whose analysis the AT&T Letter relies so heavily, testified in 2005 against the use of a "hypothetical" network standard, stressing instead that the network actually deployed by the provider should be considered:

> **Q14. HAS THE FCC INDICATED THAT TELRIC RELIES ON COST INFORMATION SPECIFIC TO THE INCUMBENT LEC SUCH AS SBC OHIO?**
> **A14.** Yes. The FCC "intended to consider the costs that a carrier would incur in the future." This can only reasonably mean that TELRIC is the method for measuring SBC Ohio's forward-looking costs rather than the costs of some unknown, hypothetical firm. Furthermore, the Solicitor General speaking on behalf of the FCC stated in his July 2001 brief to the Supreme Court in Cases No. 00-511, 00-555, 00-587, 00-590 and 00-602 that TELRIC "rests on the rational economic assumption that as new, more efficient equipment becomes available, the value of older, less efficient equipment will be affected." Further, the Solicitor General stated:
>
> > The costs measured by TELRIC are nonetheless *those of the incumbent itself* [emphasis added]. Those costs are based, moreover, on actual prices of equipment that is commercially available today—equipment that carriers are already using to upgrade and expand their networks.
>
> These comments clearly indicate that TELRIC is based on current information and knowledge. In addition, this TELRIC methodology is applicable to SBC Ohio. Consequently, TELRIC methodology must rely on actual information and knowledge of SBC Ohio and not information and knowledge of hypothetical firms or firms that are not incumbent local telephone companies.[56]

50. The same notions are expressed by another AT&T witness, Dr. Deborah Aaron:

[56] Ohio Public Utilities Commission, Case No. 02-1280-TP-UNC, Direct Testimony of Dr. Kent Currie on behalf of SBC Ohio (now AT&T) at 5-6 (emphasis in original, footnote omitted).

> It is both appropriate and necessary to hold a purported TELRIC analysis up to the light of reality to assess whether the modeling has deviated from any reasonable representation of costs that *could be achieved by a real firm going forward.*[57]

51. Clearly, it is unlikely that "the incumbent itself" – *i.e.*, AT&T – will be 100% softswitch based in the foreseeable future. The startling *inconsistency* in AT&T's advocacy should cause the Commission to seriously discount the information AT&T has provided in this proceeding. In sum, AT&T's analysis is fatally undermined by the unrealistic and irrational assumption that all traffic terminates exclusively over softswitches.

52. For the reasons discussed above, we include the cost of Softswitch to TDM handoff in our "High Estimate." In order to demonstrate that even without this correction our re-stated cost estimates are significantly higher than AT&T's estimates, we exclude these costs from our calculation of the "Low Estimate," which is generated here for illustrative purposes and does not change our opinion that costs associated with such a hand-off or the existence of hybrid networks should be ignored in the foreseeable future.

IV. COST METHODOLOGY ISSUES

53. While the FCC offered the states three options for establishing rates for transport and termination in its *Local Competition Order*, the FCC determined

[57] Michigan Public Service Commission, Case No. U-13531, Direct Testimony of Dr. Deborah Aaron on behalf of SBC Michigan (now AT&T), May 2, 2003 at 16 (emphasis added).

that its TELRIC methodology is the proper *cost standard* for determining the "additional costs"[58] for terminating calls:

> 1. States have three options for establishing transport and termination rate levels. A state commission may conduct a thorough review of economic studies prepared using the TELRIC-based methodology outlined above in the section on the pricing of interconnection and unbundled elements.[59]
>
> [...]
>
> Moreover, forward-looking economic cost studies typically involve "a reasonable approximation of the additional cost," rather than determining such costs "with particularity," such as by measuring labor costs with detailed time and motion studies.[60]

54. The AT&T letter does not explicitly discuss issues of costing methodology, so it is not clear to what extent AT&T's analysis is intended to adhere to the FCC's TELRIC methodology. However, while, as we have already discussed, AT&T's assumption of a 100%-softswitch-based-network is misguided and unwarranted, AT&T's assumption is clearly based on long run, forward-looking considerations.

55. Further, AT&T's analysis relies on 1400 "Monthly switching minutes per line" in order to generate specific costs per minute.[61] AT&T's Letter does not indicate whether these 1400 minutes represent "total demand" for the switching element – as required under TELRIC – or a smaller incremental volume of demand. However, based on our experience with ILEC cost

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[58] 47 U.S.C. § 252(d)(2)(A)(ii).

[59] *Local Competition Order*, ¶ 1055; *see also* 47 CFR §§ 51.705 and 51.711.

[60] *Local Competition Order*, ¶ 1056.

[61] AT&T Letter at 5.

studies, we believe that 1400 minutes reasonably approximates total demand, consistent with TELRIC.

56. But, while AT&T's cost analysis appears to have some TELRIC characteristics, there are other aspects of the analysis that deviate from TELRIC. For example, the AT&T analysis has a component labeled by AT&T as "Monthly TS revenue requirement per line."[62] The term "revenue requirement" is a peculiar cameo appearance, however, of a concept associated with rate-of-return analysis, which is explicitly prohibited for transporting or terminating calls, as is evident from the following citation:

> We find that section 252(d)(2)(B)(ii) [...] indicates that section 252(d)(2) shall not be construed to "authorize the Commission or any State to engage in any rate regulation proceeding to establish with particularity the additional costs of transporting or terminating calls," [...] we believe that Congress intended the term "rate regulation proceeding" in section 252(d)(2)(B)(ii) to mean the same thing as "a rate-of-return or other rate-based proceeding" in section 252(d)(1)(A)(i). In the section on the pricing of interconnection and unbundled elements above, we conclude that the statutory prohibition of the use of such proceedings is intended to foreclose the use of traditional rate case proceedings using rate-of-return regulation.[63]

57. Whatever methodology AT&T may have employed, we believe that TELRIC is the appropriate methodology for costing and pricing call termination costs for the following reasons.

58. First, as the FCC notes in its *Local Competition Order*, "economists generally agree that prices based on forward-looking long-run incremental costs (LRIC) give appropriate signals to producers and consumers and ensure efficient entry

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[62] *Id.*

[63] *Local Competition Order*, ¶ 1056.

and utilization of the telecommunications infrastructure."[64] The FCC then goes on to explain the general equivalence between Total Service LRIC and Total Element LRIC, and adopts the latter terminology.[65]

59. Further, to be consistent with the language of Section 252(d)(2)(A)(ii), it is important that the *increment* of output – in the LRIC study – appropriately captures the "additional costs" of terminating "calls." To capture the "additional costs" of terminating "calls," the increment of output in the study has to be the *total volume of traffic* that is terminated. Thus, the cost concept has to be some variant of a *total service* incremental cost methodology, which TELRIC is. Specifically, any cost methodology that fails to capture total service demand, and TSLRIC and TELRIC do, would be at odds with the plain language of Section 252(d)(2)(A)(ii): it would simply fail to capture all of the "additional costs" and capture only *some* of the "additional costs."

60. For example, a marginal cost construct would not be appropriate. Marginal cost calculates the additional cost associated with *one and only one* additional unit of output. Clearly, this cost construct is inconsistent – as a matter of economics – with the plain language of Section 252(d)(2)(A)(ii), which speaks not of the additional cost of terminating a single call but of the "additional costs of terminating such calls," *i.e.*, the cost*s* of terminating the *total volume* of call*s*.

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[64] *Local Competition Order*, ¶ 630.

[65] *Id.*, ¶ 672.

61. Next, as in all instances in which carriers are required to offer wholesale services to other carriers, it is important that rates are appropriately compensatory.[66] Rates set at forward-looking total service long run incremental costs, such as TELRIC, are appropriately compensatory.[67] By contrast, rates based on a simple marginal cost analysis may be compensatory for the one, single additional unit under consideration but will fall far short of proper compensation for the total volume of calls.

62. Last, it is important to recognize that, where it concerns long distance traffic terminated by CLECs for IXCs, intercarrier compensation rates will provide for one-way compensation flows. That is, when CLECs terminate traffic for IXCs compensation is *one-way* and not *mutual and reciprocal* as envisioned by Section 252(d)(2)(A)(i). Specifically, Section 252(d)(2)(A)(i) provides as follows:

> (i) such terms and conditions provide for the *mutual* and *reciprocal* recovery by each carrier of costs associated with the transport and termination on each carrier's network facilities of calls that originate on the network facilities of the other carrier;

(Emphasis added.)

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[66] AT&T and Verizon have in other fora suggested that intercarrier compensation rates should mimic competitive market prices and do not need to ensure adequate compensation to all carriers. This reasoning is flawed. In competitive markets, companies are able to scale back their operations and avoid losses for products when prices fail to be compensatory. By contrast, with respect to intercarrier traffic, no carrier is in a position to refuse traffic and, thus, they cannot scale back their operations to avoid losses when intercarrier compensation rates fail to be compensatory.

[67] TELRIC based rates will be compensatory for a specific company provided that the TELRIC study adequately reflects the specific circumstances of the company in question. For example, in ¶ 685 of its *Local Competition Order,* the FCC discusses the need to not deviate from the providing carrier's specific network topology and found: "This benchmark of forward-looking cost [*i.e.*, TELRIC] and existing network design most closely represents the incremental costs that incumbents *actually* expect to incur in making network elements available to new entrants." (Emphasis added.) This also means, of course, that a TELRIC-based rate for one company is not automatically compensatory for another dissimilar situated company.

63. Because CLECs will presumably not get to terminate traffic to the IXCs' networks on mutual and reciprocal terms, it is critically important that any intercarrier compensation rates be adequately compensatory, otherwise CLECs will be forced to subsidize IXCs with below-cost call termination. Again, rates set on forward-looking total service long run incremental costs, such as TELRIC, are adequately compensatory while rates set on more short-run, marginal analysis are not.

64. In our restatement of AT&T's cost analysis, we use a forward-looking total service long run incremental cost methodology, which, because it concerns network elements, is also TELRIC.[68]

V. RESTATEMENT OF AT&T'S MATHEMATICAL ANALYSES

65. In the table below we correct the many errors and omissions included in AT&T's original analysis. First, we correct AT&T's "Total investment per line" consistent with our discussion above (focusing only on the "high estimate" as it corresponds most closely with NuVox's invoiced costs for softswitch equipment – AT&T's low estimate was flawed in conception and substantially out of line with softswitch invoices we have seen on behalf of NuVox and other carriers). While our investment per line is a point estimate (rather than a range as employed by AT&T), we use a range approach for

[68] It is important to note that no specific changes to the AT&T calculations were necessary to incorporate this methodological approach as we believe the AT&T calculation (by using the 1,400 minutes of use per month) already relies upon this same method.

other numerical assumptions, and consequently, our final per minute cost is also represented by a range of "Low" and "High Estimate."

66. Second, we add costs associated with ancillary equipment, without which, as explained above, a softswitch cannot terminate voice traffic. Based on NuVox's experience, we assume that ancillary equipment constitutes a 35% markup over softswitch per line investment.

67. Third, we replace AT&T's assumption that 20% of switching cost is traffic sensitive with low and high estimates of 80% and 100%, respectively.

68. Fourth, we use a 35% Annual Charge Factor (instead of AT&T's 25%) to properly account for capital recovery, maintenance, land and building costs associated with the switch.[69]

69. Fifth, we add per minute transport cost (taken directly from QSI's analysis of NuVox's average transport costs per switched minute of use) to correct the fact that AT&T's analysis completely ignores the transport portion of "transport and termination cost" - the cost at issue in this docket.[70]

70. Sixth, for our "High Estimate" we add the cost of the handoff between the Softswitch and TDM network to reflect the reality of modern networks in which the majority of traffic that is terminated today (and will be terminated for the foreseeable future) relies upon a hybrid circuit-switched/soft-switched

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[69] See section II for the support of this number.

[70] See section II for further discussion of this methodological error in AT&T's analysis. It is important to note that this figure does not include any costs associated with aggregation equipment in NuVox collocations (even though we believe some large proportion of those are reasonably included in the costs of call termination). The figure included in the study is strictly related to transport costs between the NuVox switch and its collocation arrangements.

platform.[71] For purposes of our "Low Estimate," we exclude this cost entirely although to do so is, in our opinion, unreasonable as such costs are likely unavoidable for at least the foreseeable future.

71. Seventh, for our "High Estimate" we add the Shared and Common markup of 25%[72] to properly account for these costs whereas, for our "Low Estimate," simply assumed a zero Shared and Common Markup.

72. These seven corrections and the resulting cost estimate for transport and termination per minute are captured in the table below.

#	Measure	AT&T Letter		NuVox Correction	
		Low Estimate	High Estimate	Low Estimate	High Estimate
1	Softswitch Investment per Line (approx.)	$34.00	$80.00	REDACTED	REDACTED
2	Ancillary IP-Enabled Voice Equipment			35%	35%
3	Total Investment Per Line			REDACTED	REDACTED
4	Percent "Traffic Sensitive"	20%	20%	80%	100%
5	Traffic sensitive investment per line	$6.80	$16.00	REDACTED	REDACTED
6	Switching Annual Charge Factor	25%	25%	35%	35%
7	Monthly TS revenue requirement per line	$0.14	$0.33	REDACTED	REDACTED
8	Monthly switching minutes	1,400	1,400	1,400	1,400
9	Switching Cost per Minute	$0.00010	$0.00024	REDACTED	REDACTED
10	Transport Costs			REDACTED	REDACTED
11	Softswitch to TDM hand-off			REDACTED	REDACTED
12	Shared and Common Costs (0% to 25%)			REDACTED	REDACTED
13	***Total Cost per Minute***	**$0.00010**	**$0.00024**	**$0.00758**	**$0.01330**

73. The resulting, corrected estimate for costs associated with the transport and termination of traffic cost is between $0.00758 and $0.01330 per minute.

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[71] *See* section III.

[72] *See* section II for the support of this number.

VI. CONCLUSIONS

74. Methodological, mathematical and sourcing errors in AT&T's analysis cause it to substantially understate costs associated with the transport and termination of telecommunications traffic. As described herein, the per minute costs of transport and termination is more reasonably estimated within a range of $0.00758 to $0.01330 – well above AT&T's estimates and the current rate of $0.0007 established by the FCC for internet service provider ("ISP")-bound traffic.

Attachment 1

REDACTED

Attachment 2

REDACTED